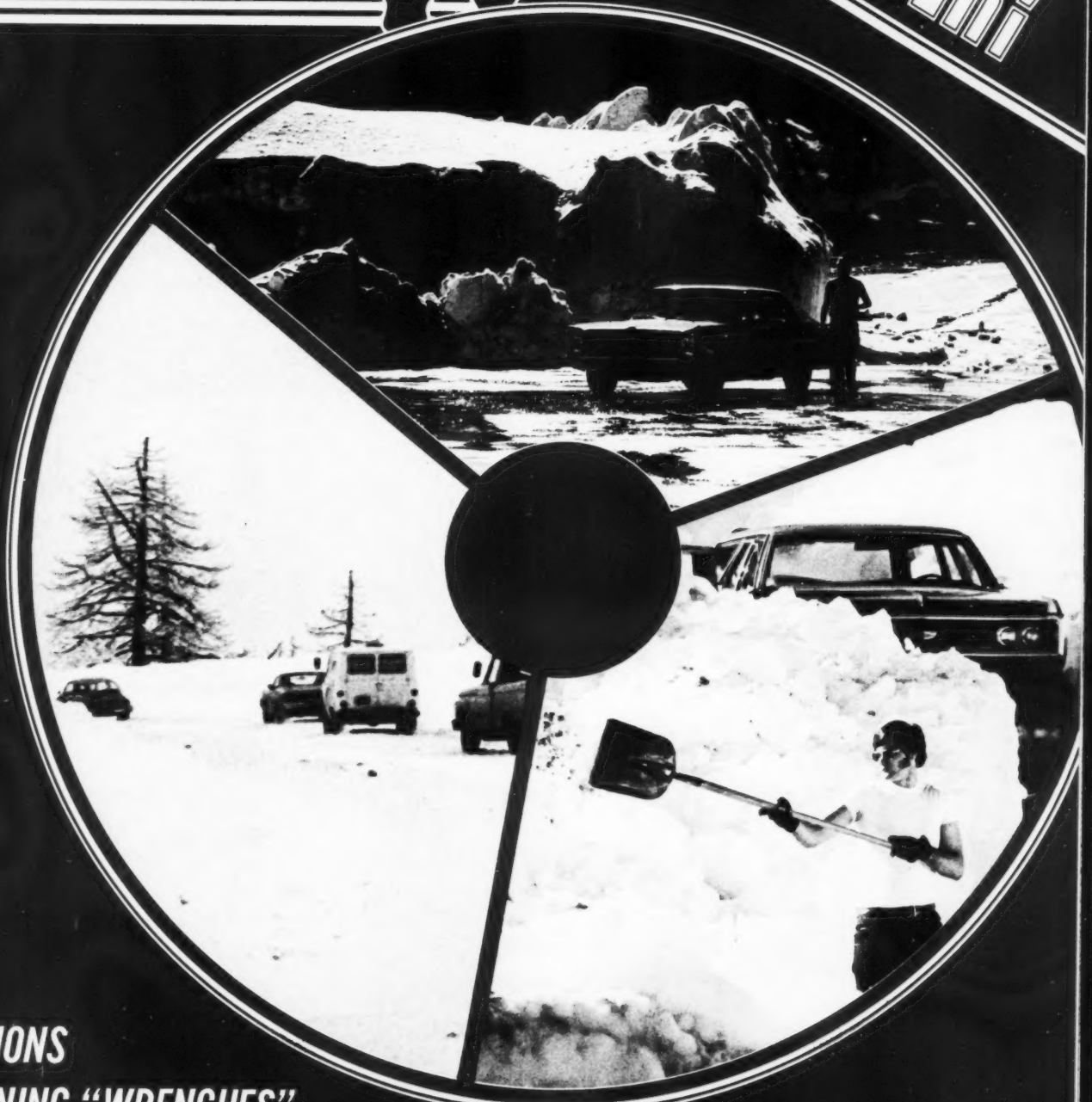
DRIVER

DECEMBER 1974

SHAPE UP, IT'S WINTER!



- OPINIONS
- TRAINING "WRENCHES"
- THE BACKYARD MECHANIC

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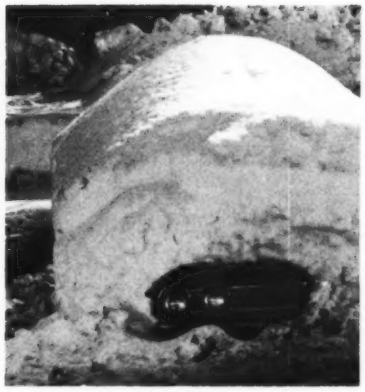

SHAPE UP, IT'S WINTER!

The secret to safe winter driving is "go gently, turn gently, stop gently."

If the only kind of driving we ever did was the winter kind—on ice and snow, in rain and sleet—we'd all be good at it. The trouble is that 8 or 9 months of the year we're busy forgetting the *feel* of winter driving. Then one frigid day, there we are clutching the wheel and treading that thin line between traction and skid . . . peering into the falling snow and remembering that the wiper blades need replacing and the brakes have been pulling to the left a little . . . wondering what happened to the money we were planning to spend at the October tire sale.

If that's how winter caught you this year, it's still not too late to get organized. Begin by checking the condition of your car and extra winter equipment.

TIRES

Tires are always critical to highway survival, but especially so in winter. Don't believe the old story that reducing air pressure increases traction on all

slick surfaces. Best bet is to have a tire gauge handy and keep tires inflated to the recommended pressure.

Check your tires now with an eye to what type of winter conditions you're facing. If you are low on tread, don't put off getting replacements, even if it means some tight budgeting. When tires with good tread are used in combination with smooth tires, unequal traction results and a skid is more likely. So don't push your luck.

Maybe you're new to winter driving and are wondering about snow tires. They do offer help under certain conditions—loose snow, for example. But they're not magic and are no help on ice.

Studded snow tires are great on glare ice but many drivers tend to put too much confidence in studded tires. They merely provide *some* traction on *some* slippery surfaces. They provide less traction on other surfaces—bare or wet pavement, for example, conditions under which you drive a lot of the time even in winter. Also remember that studded tires are banned or restricted in some parts of the U.S. and Canada because they cause pavement wear.

If you have a fairly new car that came with radial tires, or if you have replaced your conventional tires with radials since last winter, don't forget that you cannot mix your old snow tires with the radials. The driving characteristics of radial tires are so different that it is actually dangerous to have radials on the front wheels and bias-ply or bias-belted tires on the rear wheels. Radials are built in such a way that when they are turned they immediately assume the new direction. If the snow tires on the rear are not radials, the risk of slipping and causing a skid is much increased, and you will have unstable handling characteristics, including wandering and fishtailing. So the rule is: radial tires call for radial snow tires.

Some motorists have the impression that the increased traction of radial tires eliminates the need for snow tires. While it is true that the radial provides better traction than the nonradial on packed or shallow snow, it cannot perform in deep snow like a winter tire can. So if you really needed snow tires before you switched to radials, you will still need them.

If you remove your radials to put on snow tires, mark them so they can be placed on the same wheel position when used again. They won't perform properly if they're mounted on a different

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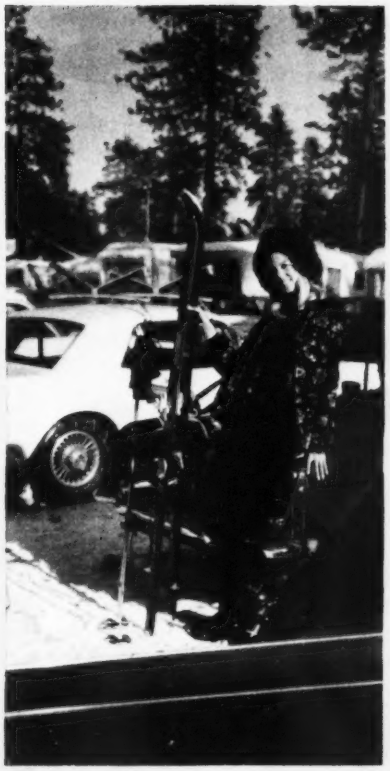

Weekend snow bunnies find chains the cheapest and best way to go since they drive on snow and ice only occasionally.

DRIVER

THE TRAFFIC SAFETY MAGAZINE FOR THE MILITARY DRIVER

DECEMBER 1974

VOLUME 8 NUMBER 7

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THE EDITOR SPEAKS

DOUBLE CLUTCH

ATTENTION AUTO/MOTORCYCLE/BICYCLE/ SNOWMOBILE/LANDSAILING CLUBS

We used to have a column going called "Motorsports Club News." But a funny thing happened. We haven't run it in months—twelve months to be exact—because nobody has sent us any news.

The thing is we know you are out there. Club members write us all the time for information and back issues of DRIVER, and the requests come from all branches of the service.

Well, how about giving us a hand and promoting interest in your club at the same time? When you send us information, be sure to include some black-and-white photos with captions. Here is the kind of information we would like to receive:

- How did you set up your club/association? (Include any info that could be of help to others setting up a club.)
- If you met with any resistance or obstacles, how were they overcome?
- What is the general purpose of your club?
- What facilities do you use?
- Number and makeup of the membership?
- What are your activities; particularly those which promote safety, improve the image of the motorcyclist (cycle clubs), promote good relations with your host country if overseas, or local community if stateside.

Any information along these lines would be appreciated by us and by many of our readers. Send it to:

Editor, DRIVER Magazine
AFISC/SEDD
Norton AFB, CA 92409

NEXT MONTH
Driving in the U.K.

Where the winters are really rugged, some people think nothing of driving their snowmobiles to work following heavy snowfalls. This employees' parking lot is at a plant in northern Michigan.

wheel position which would reverse the direction of rotation. Studded and radial snow tires should be marked before storing for the same reason.

CHAINS

Chains offer the greatest increase in traction over the widest variety of winter road conditions and reduce stopping distances as much as 50 per cent. So the most practical winter driving precaution for most people is to replace worn tires with conventional treads and use lug-reinforced tire chains when they are needed. (Even snow-tire users are wise to keep a set of chains handy for really bad road conditions.)

Some people say chains are too much hassle. But installing them is really a cinch and they are simple to remove when they're no longer needed. If you've never installed chains, make a dry run of the installation procedure at home.

First, make certain your chains are of the proper size. If they're not, you'll cause yourself no end of misery trying to get them on in the snow. And if the chains were used before, check to see if the links are still in good condition.

Spread the chains on the ground behind the rear wheels to remove tangles. Hooks should be to the rear. Reinforced chains are best and projecting teeth or cleats should be facing up.

Gather the chains behind the tire so they won't catch the fender, and attach the end links to the "chain applier," a simple spring steel wire that is easily slipped onto the tire.

Drive the car forward about one wheel revolution so that the applier carries the chains around the tire.

Remove the applier and fasten the inside hook first, then the outside hook. With a little practice the inner hook can be fastened by feel and you won't have to get under the car.

One important safety precaution: If you have to install the chains while on the road, find a level spot to park and be sure you are a safe distance from passing cars.

UNDER THE HOOD

The cooling system should be free from leaks and contain the proper antifreeze mixture. Factory-installed coolant is top quality and should be good for two years or 24,000 miles. Some other types should be replaced every year. Antifreeze prices will be up this year and it will be in short supply in parts of the U.S. However, the European Exchange System said in October that its outlets would have ample supplies for you who are stationed in Europe.

Be certain that the exhaust system is in good shape. Even with the windows "cracked," carbon monoxide, leaking from defective exhaust or tail pipes, or mufflers, is an ever-present hazard. Be especially careful when driving in heavy traffic for extended periods, and when warming up the car in the garage with the doors closed.

Don't overlook the battery. It is more affected by cold temperatures than other vehicle components. Keep it at full charge during cold weather by maintaining proper water level. Avoid overuse of accessories. Thoroughly clean the battery case, terminals, and cables, and tighten and cover connections with graphite spray or a light coating of petroleum jelly to prevent corrosion.

If you usually use an oil additive which increases viscosity, don't overdo it in very cold weather. Increased viscosity can make a cold engine very stiff and hard to start.

BRAKES

Have the brakes checked if you notice any uneven pulling to one side. It may be a case of uneven tire pressure, but pulling can be a symptom of brake problems. And uneven braking on slippery surfaces can cause handling problems.

VISIBILITY

In freezing weather, you'll need an antifreeze solution in your windshield washer, too. Don't use the radiator kind —it can damage paint. And don't take a chance on a too-weak mixture. A test in your driveway may not tell the story, since when you're driving, the airstream will evaporate antifreeze quickly, and evaporation takes heat from the water and glass. You don't want a blinding sheet of ice at traffic speed. And it's especially important that your wipers are in good condition. Rubber blades that are aged and cracked by hot summer sun are likely to streak the windshield. Even good blades do a poor job if the arm tension is inadequate.

A CLEAN CAR

If your car is covered with snow, don't just scratch a peephole in the windshield and figure it's good enough. Brush snow completely off the front, back, and side glass. Use the scraper end of the snow brush to clear off ice and crusty snow. Brush off the hood and top, too, so it won't keep dusting back on the windshield and rear window.

Not only is this a safety precaution, it's an economy measure too. Last year, Buick weighed a car found sitting in its Flint, Michigan, parking lot loaded down with snow. It was 750 pounds

continued

overweight, with icy slush packed into the wheel wells and heavy snow covering the roof, hood and rear deck. Besides increasing gas consumption, this extra weight puts a strain on the entire suspension system. A considerable amount of salt is usually mixed with the slush packed into the wheel wells and can cause severe corrosive damage to the undersides of the fenders and body if left there all winter. So keep it clean.

GO GENTLY

If there is one word to describe good winter driving techniques it is *gentle*. When driving on snow or ice-covered roads, practice *gentle* acceleration, *gentle* braking, *gentle* maneuvering. Try not to break the very tenuous traction between tires and slick ice, packed snow, loose snow, even just plain wet pavement. If you accelerate too hard, the drive wheels spin and can polish the surface under the tires even more.

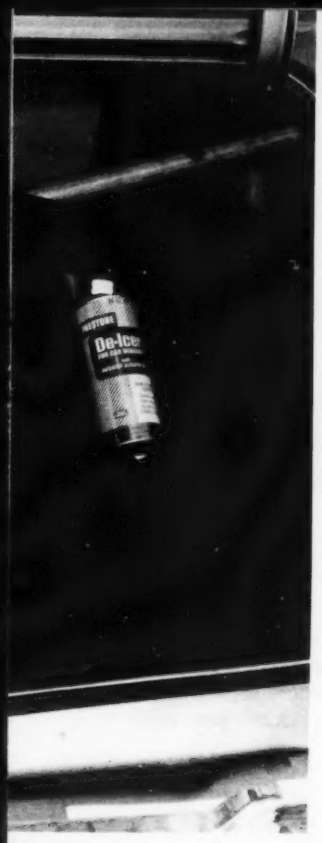
And go easy when you stop. Allow yourself room to begin stopping sooner than you do on bare pavement. Remem-

These few simple items—shovel, chains, de-icer, and a tarp or blanket —will help you in the worst of weather.

(right)
Winter brings water problems, too. Have you reviewed your lessons about controlling hydroplaning?

Before starting out, brush off snow and clear the glass surfaces. Don't be the lazy "peephole" type.

(right)
Windshield wipers are especially important. If you have new blades and still get smears, check the arm tension.



ber to brake gently, not hard. And if your wheels do lock and you start to slide, pump the brakes. This allows the wheels to turn and provides a measure of steering control. If the wheels are locked, momentum will just carry the vehicle in the direction it is heading—straight down the road, off the road, or into on-coming traffic. No amount of steering-wheel action will change the direction.

Being gentle on slippery surfaces is also the best insurance against skidding. Many young drivers say this is the action they fear most since very few driver education programs offer training in skid control. Although reading about it isn't the same as actual in-car training, knowing something about it can help. If your car goes into a skid (and most skids on slippery roads are caused by taking curves too fast for conditions) and the rear of the car slides to the right for instance, take your foot off the accelerator and quickly steer to the right.

If you steer into a skid quickly enough the car will start to straighten out, and you return the steering wheel to the straight-ahead driving position as the rear wheels line up with the front. If you don't "catch" it at the right moment as the car straightens out, be prepared to counter-correct because the rear of the car may start to skid in the other direction. If a counter-skid does occur, you merely steer in the direction of the second skid. Counter-skids can occur three or four times on really slick surfaces, so don't give up.

Watch for icy patches on otherwise bare roads. These occur in shaded areas. Sometimes the surface of a bridge or overpass will remain icy while the roads are clear. If you see that you must drive over a stretch of ice, do any braking you must do *before* you are on it.

Needless to say, you should allow greater following distances in all slippery driving situations. Even at 20 mph, you can use up 10 times more stopping distance on ice than on dry pavement.

So there you have it. With a vehicle in good order and some simple adjustments in your driving practices, you'll drive into Spring with no problem.

continued

(below)
Intersections and railroad tracks demand constant attention. They are often covered with snow, under which might be ice, and are plied by those huge plows that don't give much when struck by a lesser vehicle.

DRIVER likes to know what you people are thinking about cars and cycles and allied subjects. So whenever we get the chance, we go out and ask questions, and print the better interviews.

By sharing these interviews with you in DRIVER we hope to provide insight into fellow drivers' beliefs and attitudes, and cause you to re-examine your own.

SGT TERRY VIEKKO
Weapons Mechanic
Home: Citrus Heights CA

1. What bothers you most about other drivers?

I get hot when other drivers have to come to almost a complete stop before making a simple turn and especially when they don't use their turn signals.

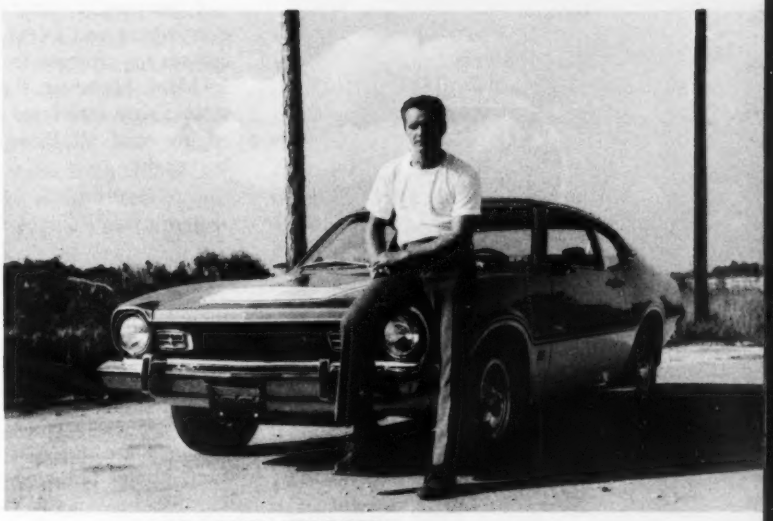
CAPT CHET MARTINDALE
F-4 Instructor Weapons System Officer
Home: Homestead FL

My biggest worry while driving is the inattention of other drivers. I especially notice this while riding my motorcycle. Some drivers have a complete disregard for anyone else on the road. Defensive driving is the only way to be sure of "arriving alive."

OPINIONS

prepared by
Lt LARRY RANDLETT

Their lack of courtesy. This is especially true in encounters between truck and car drivers; and car drivers and cycle drivers.



A1C LARRY FEDROFF
Aircraft Maintenance Specialist, 1 & 2 Engine
Home: Carteret NJ

Inconsiderate actions which result in potential hazards. Because I drive a Lotus Europa and 750 Norton, I must drive defensively or end up on the losing end. Therefore, those types of actions get on my nerves the most. I like to know what the other person is going to do. A driver who turns or changes lanes without turn signals must expect me to read his mind and not pass into his turn. Another inconsiderate driver that bugs me is one who travels the passing lane doing 10 mph under the speed limit and usually he is co-speed with the car in the right lane. This driver is probably the same one who turns onto a four-lane highway and takes your lane when the other lane is open.

2d LT DANIEL R. WYSOCKI
Fighter Gator
Home: Warren OH

2. What is your opinion of safety belts?

3. How do you feel about mandatory vehicle safety equipment?

Safety belts probably save more lives than any other single safety device. I wouldn't have a car without them.

Mandatory vehicle safety equipment is a fairly sudden change, and sudden changes usually take some time to get used to. It's a good idea and something that can be lived with (no pun intended).

I personally wear my seat belt everywhere and I feel it definitely increases my chances in the event of an accident. However, the new interlock system sure interferes with tuning the engine, and all those buzzers really bother me.

Most of the new equipment is just what automobiles have needed for years; steel door guards, better locking doors, and energy-absorbing bumpers. I still believe in personal responsibility in driving and would like to see less buzzers and lights and more sound engineering ideas.

By using them, you really increase the odds of living longer. Some people have their own ways of beating the safety systems on the new cars. But they are not really beating anything—only reducing the odds on their life.

I'm for most safety precautions, but I feel the idea of retractable bumpers is questionable. They are not such a good idea, because how many accidents occur at the speed of five miles an hour, and what kind of damage would it cause anyway? It would be better to come up with a car designed to withstand an impact of 40 or 50 miles an hour—but that's just my opinion.

You're insane not to use them. A fighter pilot would not even consider taking off without strapping in first, and there are many more accidents on the ground. They come in handy in avoiding accidents also. Have you ever cornered hard to avoid something (or somebody like a small child) and found yourself on the passenger side because you did not have your seat belt on? Being strapped in may have avoided that accident.

Great if it's money spent on safety equipment and not on items such as buzzers to make the idiot put on his belt. I like seeing real safety equipment such as items to make the car handle better to avoid accidents. I believe a dollar spent to avoid an accident is worth much more than one spent to protect during an accident. However, money spent on seat belts, roll bars, collapsible steering columns, etc., is well worth it. My complaint is let's make the cars safe to drive before we make them safe to wreck.

4. What qualities do you look for in a car?

I look for styling, simplicity, performance, and for the car to be fairly trouble-free. Cars are my hobby so I look for a wide variety of after-market parts to be available for them also.

5. What should be done to conserve gasoline?

That's a hard question to answer since I *personally* feel there is no shortage. But, since gas is more expensive than it was a year or a year and a half ago, I generally do a little more walking than I used to do on short trips.

6. What would you do to make cars/drivers safer?

I think radial tires as standard equipment and higher intensity high beams on the headlights would be a start, although the base price would be affected due to the higher cost of radial tires.

As for drivers, I feel a driver is only as good as he/she wants to be. A good driver will be more courteous and not take any chances while driving. I'm a firm believer in the expression, "Watch out for the other guy."

The qualities I look for most in a care are good directional stability at all speeds, acceptable performance, pleasing appearance, and general solidarity. Now that gas prices are going up, economy will also be on my list for my next car.

I'm no expert but recent studies prove that more frequent tuneups, radial tires, and careful consideration while driving all help. Generally, the way you drive will determine your mileage. Avoid short unnecessary trips and quick starts from stop signs. A vacuum gauge is an effective way to monitor your engine's performance and economy.

Making cars with quicker steering, better suspension, and more responsive engines would have to make them safer because of the increased control a driver would have. Coupled with this would have to be a driver education course oriented toward actual driving techniques and procedures. We have engineered safe cars but we need safe drivers to go with them.

To be truthful, what interests me most is appearance, and then I work from there.

The answer to this question depends on individual people making up their minds to help. Although the fuel crisis is no longer the threat it was before, it *is* hurting our pocketbooks now. But now is the time to think of the future and not wait for the other guy to act. Do your thing, and do it now.

As far as cars go—they should be built stronger. And, as I said before, I think most safety precautions are a good idea.

As for making drivers safer, I feel this must be done as they are first being taught to drive. They will develop their own habits later, and let's hope they are for the better!

Owning a Lotus answers this question. This car is a refined piece of machinery that the U.S. producers have difficulty in matching because they are more concerned with their yearly style changes. Few cars can handle like the Lotus; yet, its ride remains smooth and comfortable. There are many other qualities I like about the car, i.e., 30 mpg, looks, etc.; however, it must be safe to drive. It must be controllable and sensitive at highway speeds.

The only thing I have to say about this is I turn red when I see people actually wasting gas. People need to be made aware. Next time you see someone waiting in a parking lot running his car for 15 minutes with air conditioner (outside temperature 80°) ask him to be patriotic and save fuel.

The real responsibility in safety is you, the person. The car companies can build cars with seat belts, roll bars, improved handling, but to avoid accidents the driver must be trained to drive defensively and know how his car will handle under maximum performance. If a child walked out in front of your car, could you max perform the car to miss the child? Or, have you ever gotten your car out of a skid in an empty parking lot or will you wait till you are sliding towards that telephone pole before trying it? Sure, everyone can't afford a safety driving course, but how about going to a vacant parking lot some snowy night—or an auto-cross—to practice driving and sliding the car. It may save your life.

TRAINING "WRENCHES"

How Air Force teaches its own auto mechanics

There's one thing most people will tell you they just can't live without . . . their car. And for some people this is literally true because their entire lives, including most of their meals, are centered in or around a car. In any case most of us realize how important the automobile is to our daily lives.

But did you ever stop to think how important motor vehciles are to the Air Force? When you get right down to it, ground vehicles are more important than airplanes—at least initially. Think of it this way. You've got to have ground transportation to get mechanics, crews, fuel, and cargo to the planes. And if the fire trucks break down, the runways are just plain shut down.

Well this list could go on and on and include all sorts of special equipment as well as the vehicles that simply truck people and supplies around the base. But the point is this: if Air Force ground vehicles shut down tomorrow so would Air Force bases. But just as important even though less dramatic is the basic fact that each base has to keep all of its vehicles running to keep the base operating at top efficiency.

GENERAL SCHOOL

To help make sure that its 103,000+ ground vehicles, which are worth over $770 million, are maintained and running in top condition, the Air Force operates one of the best equipped and staffed basic auto repair schools anywhere. Officially known as the General Purpose Vehicle Repairman Course, the 12-week* school at the Chanute AFB, Illinois, Technical Training Center is designed primarily to provide students with a basic background in automotive systems and repair.

PURPOSE

As Major Roger Hansen, Chief of the General Vehicle Training Branch, puts it, "The purpose of the basic course at the general school is not to turn out fully qualified, expert mechanics. What we're after here is a demonstrable 3-level (apprentice) mechanic who can turn out high-quality, basic maintenance safely and professionally at the lowest possible cost. And a mechanic who fully understands automotive systems so that he can quickly progress to a skilled 5-level (journeyman) mechanic through on-the-job training.

Mr. Charles (Chick) Merideth, longtime instructor and currently a train-

**The course actually runs 12 weeks and 3 days.*

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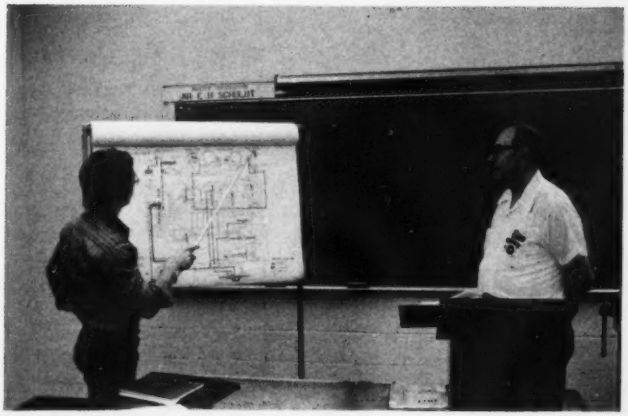
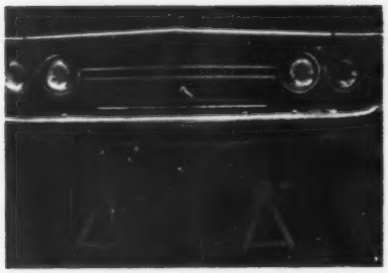


(left and above)
Normal classroom sessions feature plenty of instructor/student interchange. Automatic transmission specialist Elmer Schuldt watches while a student clarifies a point.

Models and visual training aids are used extensively during classroom study. A1C Duane Hopkins explains the workings of a standard transmission.



Basic safety tips are emphasized, including removing jewelry and the use of safety stands and goggles.

ing advisor, elaborated. "The most important idea stressed in our course is a systematic approach to auto repair based on a thorough understanding of automotive systems. We don't teach 'show and tell' maintenance where a person learns to replace parts without really knowing why or whether or not the part was even faulty. For instance, we don't teach a guy or girl how to disassemble a carb on a 1973 Chevy half-ton pickup. But rather we teach the fundamentals of carbs and carburetion so the mechanic has the basic knowledge to perform maintenance on a wide variety of vehicles by referring to the appropriate manual."

NEW EMPHASIS

Despite the many recent changes in auto design and maintenance procedures —especially in emission control systems —the basics have not really changed, according to Mr. Merideth. But along with teaching basic automotive systems as it always has, the school has recently begun putting extra emphasis on a couple of things. "First of all, it just can't be stressed enough that the manufacturer's specifications are strictly adhered to. Engines have been redesigned and retuned to reduce emissions. I think all of us understand how important this is. So it is the responsibility of every mechanic to make sure the engines are tuned and maintained to specs," Merideth emphasizes. "Also along these lines, today more than ever before a manual is absolutely essential. Here at the school we stress the use of an up-to-date manual. And that's one thing that is constantly checked out in the field—does the guy use the book?

"An interesting point here is that today we have many self-styled experts with various methods for getting better engine performance. For instance, by spending all kinds of money you can up your horsepower 15 percent. But on the average street car you can change the horsepower 15 percent and the owner probably won't even notice it. And to get this additional power you spend a lot of bread and probably sacrifice some reliability and gas economy. Now I'll agree that if you're building a racing engine there are a lot of changes from the stock engine design that are very beneficial. But for the average street car—keep it maintained to the manufacturer's specs for best service and mileage at the lowest cost," Merideth concluded.

BASICS STRESSED

The course itself is broken down into seven major blocks of instruction that begin with the barest of basics such as proper tool handling and shop safety. Safety is not just emphasized at the school, but is an integral part of the program.

Instructors stress that working safely is really just part of working efficiently and makes the job easier. It's only common sense, they say, to keep the work area neat and clean and not leave a floor creeper or tools lying around where you can slip on them. Also, according to the instructors, a lot of students don't think about the effects of letting their tools get dirty and greasy until their hand slips off the wrench and they get about four bashed knuckles; then they start keeping the tools clean.

TRADE SECRETS

Some of the tricks of the trade do have to be learned, like *pulling* on a wrench instead of pushing whenever possible to reduce the possibility of a mashed hand if the wrench slips. And things like using the right tool for the job and always supporting a raised vehicle with safety stands are constantly reemphasized because the instructors know from experience that people sometimes neglect these items when in a hurry.

Throughout the course the students pick up a lot of other basic tips that help them work more safely and efficiently. Recommendations include always making sure to have good footing when leaning over the fender to work on the engine, and checking the underside of a vehicle for jagged edges before crawling under to work. Using goggles when working under a vehicle is one of the most important but hardest tips to sell, according to instructors.

JEWELRY SNAG

But jewelry is the biggest problem with new students—instructors say they frequently have to remind the students to remove all jewelry before working on a vehicle or with any equipment. And eliminating the source of a shock or burn by removing the ground cable from the battery (unless power is needed to perform the maintenance) is also an important procedure stressed.

MISCONCEPTIONS

"Besides simply orienting the new students, one of the main reasons the training starts with the very basics is that over the years we've discovered that "untraining" people is more difficult than training them," says Merideth. "Even among students who've had auto tech courses before, we've found there are a lot of misconceptions and often just a plain lack of knowledge about basics such as carburetion," he emphasized.

The Air Force is also convinced that the school's approach does the best job of training mechanics and has done away with the direct duty assignment in the vehicle repair career field. There

continued

Course Material — UNCLASSIFIED
BLOCK I — Publications
30 Hours TT

Course Orientation, Shop Safety, How to Study, Vehicle Maintenance Career Field, Basic Math, and Security (6 hrs); Hand, Special, and Measuring Tools (6 hrs); Air Force Technical Orders and Commercial Publications (9 hrs); Maintenance Management (3 hrs); Maintenance and Inspection System and Forms (4½ hrs); Measurement and Critique (1½ hrs)

30 Hours C/L

Course Material — UNCLASSIFIED
BLOCK II — Engines
60 Hours TT

Principles of Internal Combustion Engines and Engine Disassembly (6 hrs); Engine Disassembly, Engine Components Inspection and Parts Servicing, Engine Reassembly, Operation, and Valve Adjustment (18 hrs); Principles, Inspection, and Repair of Cooling, Lubrication, and Crankcase Ventilating Systems, and the Use of Valve Reconditioning Equipment (6 hrs); Basic Soldering, Cutting, Bending, and Flaring Copper Tubing (4 hrs); Climatic Techniques, Corrosion Control, and Storage (2 hrs); Gasoline Engine Fuel System Units and Emission Control Systems (6 hrs); Construction and Operating Principles of Carburetors and Governors (9 hrs); Service, Repair, and Adjustment of Carburetors and Governors (7½ hrs); Measurement and Critique (1½ hrs)
60 Hours C/L

Course Material — UNCLASSIFIED
BLOCK III — Auto Electrical Units
76 Hours TT

Fundamentals of Automotive Electricity, Batteries, and Basic Electrical Circuits (12 hrs); Battery and Magneto Ignition Systems (18 hrs); Cranking Motors and Starting System (6 hrs); DC Charging System (9 hrs); AC Charging System (13½ hrs); Measurement and Critique (1½ hrs)

60 Hours C/L

Course Material — UNCLASSIFIED
BLOCK IV — Tuneup and Troubleshooting
80 Hours TT

Field Methods of Troubleshooting Engine Systems (18 hrs); Scientific Tuneup of Mechanical, Battery, Ignition, Fuel, Lubrication, Cooling and Crankcase Ventilation Systems (12 hrs); Tuneup and Troubleshooting Engine Mechanical, Fuel, Ignition, Anti-Pollution, and Emission Control Systems Using Diagnostic Test Equipment (18 hrs); Troubleshooting, Diagnosis, and Repair of Lighting, Warning, Signal Systems, and Headlight Testing (10½ hrs); Measurement and Critique (1½ hrs)

60 Hours C/L

Course Material — UNCLASSIFIED
BLOCK V — Power Trains
78 Hours TT

Clutches, Standard Transmission, and Power Takeoff (6 hrs); Clutch and Transmission Removal and Replacement (6 hrs); Transfer Case, Sprag Units, Propeller Shafts, Center Bearings, Universal Joints, and Winch (6 hrs); Conventional and Anti-Spin Differentials, Front and Rear Driving Axles (12 hrs); Principles of Operation and Maintenance of Torque-Flite and C-4 Automatic Transmissions (18 hrs); Principles of Operation and Maintenance of 3 Speed Borg-Warner Transmission (10½ hrs); Measurement and Critique (1½ hrs)

60 Hours C/L

Course Material — UNCLASSIFIED
BLOCK VI — Brakes and Suspension
80 Hours TT

Hydraulic Brakes and Vacuum Brake Boosters (6 hrs); Hydraulic Brake System Servicing ((6 hrs); Air and Air Over Hydraulic Brake Systems (12 hrs); Conventional and Power Steering Systems (6 hrs); Frame Alignment and Wheel Balancing (6 hrs); Steering Factors, Springs, and Shock Absorbers (6 hrs); Service and Adjustment of Beam-Type, Front-Axle Suspension System (6 hrs); Service and Adjustment of Independent Suspension System (10½ hrs); Measurement and Critique (1½ hrs)

60 Hours C/L

Course Material — UNCLASSIFIED
BLOCK VII — Compression Ignition Engines and Automotive Air Conditioning
52 Hours TT

Technical Orders (3 hrs); Compression Ignition Engine Familiarization, Operation and Servicing (15 hrs); Principles of Refrigeration and Air Conditioning (6 hrs); Construction and Operation of Air Conditioning Components (5 hrs); Course Critique (1 hr); Inspection, Troubleshooting, Evacuating, and Charging Air Conditioning Systems (15½ hrs); Measurement and Critique (1½ hrs); Traffic Safety Predeparture Briefing, and Graduation (1 hr)

48 Hours C/L

Fig. 1

(right)
Checking a manual first, two students prepare to tear down an engine. By the third week of training students have completely torn down and rebuilt an engine. In the process of the tear down a student carefully removes a push rod.

continued

(above)
Students learn to operate all of the latest equipment includ
and dynamometers. Major Roger Hansen, Chief of the ve
strates the latest in portable alignment equipment.

(left)
Stan Wallace, Chanute and college auto technology instruc
shooting with students.

(below and right)
Specialty courses for experienced mechanics from the field
such areas as automatic transmissions, air conditioning,
dents get into the nitty gritty of an automatic transmission.

still is a bypass specialty test that allows those who can qualify on the test to skip the formal training. But very few people take the test because they prefer to attend training.

Two people who did take the bypass test are now instructors at the school. Both are so sold on the program they said that taking the bypass test was the worst thing they ever did. One instructor added that he learned more in one week at Chanute than he did in a year out in the field.

ENGINE TEARDOWN

Even though the course is considered a "basic" program, by the third week of the course the students have completely torn down an engine and put it back together. And these engines are not models, they are standard six-cylinder engines that run when the students tear into them and they have to run when they're put back together.

After the students tear down an engine in the second block of training, the course progresses through auto electrical, tuneup and trouble-shooting, power trains, brakes, and finally compression ignition engines (diesel) and air conditioning. Figure 1 (page 13) is the course outline that shows exactly what is studied during the 12 weeks.

CLASS AND LAB

All blocks of material begin with standard classroom instruction which is made "not-so-standard" through the use of extensive visual aids, working models, and plenty of interchange between students and instructors. Many of the elaborate models and instructional aids were designed by school instructors specifically for use at the school.

The highlight of the classroom sessions are when they end, for this is when the impressively equipped auto lab comes to life with the students trying out their newly learned skills. For most of the students, getting out in the lab and "wrenching it" under the helpful eye of the experienced instructor/mechanics is what it's all about.

Plenty of practical experience in the lab is considered one of the most important parts of the training program. And along with passing written exams, students must also pass criterion checks where they physically demonstrate their ability to perform the mechanical procedures.

SUPER LAB

Equipped with about every piece of equipment any mechanic is ever likely to use, including dynamometers and the latest super-scientific test equipment and analyzers, the Chanute auto lab is one of the most impressive outside of Detroit. In fact, a college uses the Chanute lab for some of its auto tech courses. And you'd think that learning to use all of the space-age equipment would be the biggest thing for most of the students. Not so. According to instructors, one of the most popular parts of the course is the block where the students learn basic field troubleshooting and tuneup.

TROUBLESHOOTING POPULAR

The most popular lab exercise is one where the instructors foul up a group of engines by installing faulty ignition coils, wires, spark plugs, and other ignition parts so the engine can't possibly run. Two students are assigned to an engine and they have to get it running using nothing more than a simple 12-volt test lamp.

Instructors say that most of the students realize that out in the field they're not always going to have the latest equipment to keep their vehicles running so they know it's important to be good at standard troubleshooting and tuneup. Also most of the students look at the exercise as a real challenge to their mechanical ability and they really dig in. If the students don't get their engine running during the normal course period you can count on them coming back that afternoon during their free time to work on it.

continued

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ne vehicle repair branches, demon-

structor, discusses ignition trouble-

field provide additional training in
ing, and electronic analyzers. Stu-
on.

continued
TRAINING "WRENCHES"

REPUTATION

The general auto repair school has a reputation for being one of the best and most successful training programs in the Air Force. And Major Hansen thinks the school deserves all of the praise it receives. "I don't think there's any doubt that we're doing a good job here—at least we have plenty of indications that we are. One example is that auto repair career field consistently gets high ratings on the occupational survey the Air Force conducts. This is a survey where the worker is asked if he feels he got proper training and if he really knows what he's doing. Then the person's supervisor is asked basically the same questions. We get very good results from both the workers and the supervisors.

"Also, when I came in the Air Force we were maintaining about 14 vehicle equivalents* per mechanic. Now we are handling about 28 equivs per mechanic. Since the vehicles have not gotten that much easier to maintain, I have to think the maintenance has improved in general. This is very important because of the fantastic investment the Air Force has in vehicles and vehicle maintenance."

**Vehicle equivalents are based on the amount of maintenance required. For instance, a large truck may represent 2 or 2½ vehicle equivalents.*

STUDENTS

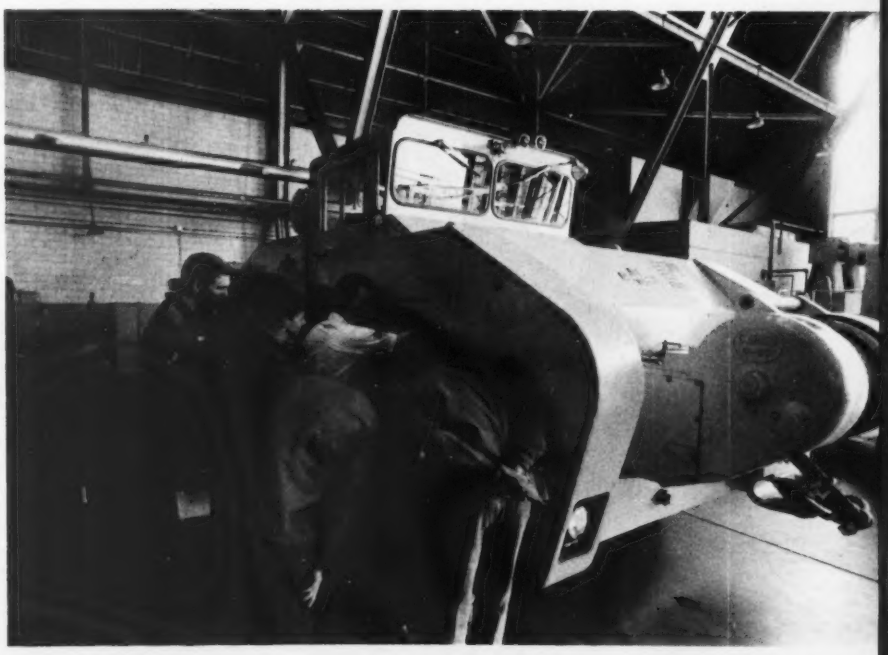
Both Hansen and Merideth agree that one of the major reasons the school has such success in turning out good auto mechanics is the students themselves. Nearly all of the students are afflicted with the North American love for the automobile, they say. Most of the students have fooled around with cars pretty extensively and many have had auto shop courses before coming to the school. But most importantly, the majority of the students just plain want to be at the school—they came in service to learn to be mechanics so they are motivated to learn as much as they possibly can. An added benefit is 12 fully accredited semester hours students earn by completing the basic repair course. Also a surprising number come to school with the intention of working as mechanics or even opening their own shop after their four years. But despite this fact, the reenlistment rate for the auto repair career field is one of the highest in the Air Force.

INSTRUCTORS

Besides the high motivation of the students and the excellent facilities, both Hansen and Merideth also agree that the real key to the success of the course is the instructors. "Well motivated, knowledgeable instructors are important to any training program," Merideth says. "But here they are essential. Because, unlike many training situations, here our students are often very knowledgeable so the instructors have to really be with it."

Instructors at the Chanute school represent the widest possible backgrounds. They include both males and females, and range from senior NCOs with years of field experience—like MSgt William Rogers who volunteered for instructor duty when his career took him into the office and out of the maintenance shop where he most enjoyed working with the young mechanics—to first-term airmen with no actual Air Force field experience—like A1C Duane Hopkins and Sgt Dan Twamley who were both selected to remain at the school as instructors because of their demonstrated knowledge and ability. There are also civilian instructors with years of specialized experience like Stanley Wallace, who has worked in automotives all of his life and teaches automotive technology at a local college in addition to teaching at Chanute.

Despite varied backgrounds, all of the instructors have one thing in common—they are all automotive experts and auto lovers. Not too surprisingly, many of the instructors grew up around machinery on the family farm. And the Chanute school is one organization where even the management is not lacking in nitty gritty knowledge. Major Hansen holds a bachelor's degree in automotive engineering and has worked in research labs as well as having



The Special vehicle repair school is also located at Chanute. Students learn to maintain exotic vehicles like fuel trucks, tow vehicles, and ground repair equipment.

made his living maintaining a fleet of construction vehicles before entering the Air Force. Chick Merideth has been an instructor with the school since back in the '50s and also ran a tuneup and repair shop.

INSTRUCTORS NEEDED

The Chanute school is always on the lookout for sharp automotive people to serve as instructors. Major Hansen says that you don't have to be a sharp teacher but just sharp automotively to volunteer for instructor duty because all instructors go through a special training program that teaches them to teach. So if you're interested in instructor duty at Chanute, submit your application in accordance with AFR 39-11 and AFM 50-5.

SPECIAL COURSES

One reason the Chanute school is constantly looking for expert instructors is that, in addition to operating the basic repair school, they also operate specialty courses in such areas as automatic transmissions, air conditioning, and electronic analyzing equipment. These courses are designed for experienced mechanics from the field and are operated as special residence courses at Chanute and all over the world by mobile travel teams.

Because of the number of vehicles that are equipped with new features like air and automatic transmissions, these courses have become very important. And as Major Hansen points out, when you're out in the middle of nowhere you can't contract out specialty maintenance like you can in downtown America. So you've got to have people who know how to fix these systems.

HOT TIPS

When we were visiting the Chanute training facility recently we got the chance to ask Major Hansen the $64,000 question: Based on your many years of maintaining large fleets of vehicles as an Air Force vehicle maintenance officer, who would you say makes the best vehicles?

"You know I've been waiting for you to ask me that question," Major Hansen paused, "because I honestly don't know. It's funny but we haven't really found any particular manufacturer's products that are in general any better, more reliable, or cheaper to maintain. It just all depends on the year, model and so forth."

Well, even though Major Hansen couldn't give us any hot tips on who makes the best cars, he and all of the rest of the automotive experts at the Chanute General Vehicle Repair School have plenty of terrific mechanical tips. Check out this month's "Backyard Mechanic" for some of these tips and more.

And incidentally, now that you're convinced how capable our auto mechnics really are, how about taking advantage of all that talent? When you drive a government vehicle, write up your complaints and observations on the daily checklist. Even wizard wrenches can't read your mind. The driver is the one who actually knows how the vehicle is performing on the job.

WINTER TIPS AND

By now you probably have your car pretty well prepared for cold times—if not you may find yourself walking real quick like. But winterizing a car is no big deal; it's basically just making sure the car is tuned and in good mechanical condition. However, since cold, wet weather makes an engine a bit reluctant to start and run properly, for hassle-free cold weather driving it's essential to make positive that everything under the hood is "right on."

Having a car that starts and runs right not only makes winter driving more fun, it also makes it safer since you won't be battling cold stalls in traffic. Also, you can concentrate more on driving and less on just keeping the engine running when things really get wintery on the road.

So here are a few tips to help you enjoy winter driving. These combined with the tips contained in "Shape Up, It's Winter" in this issue should get you through winter with no sweat—provided you're careful. Following the winter tips are a list of hints you should find helpful for year-round driving. Many of these tips were picked up from the instructors at the Chanute auto repair school—see "Training 'Wrenches' " on page 10.

■ A good tuneup helps insure that your car's engine fires up and keeps running on those cold mornings. Besides all of the other benefits, a well-tuned engine is easier on the battery in winter by drawing less power during cold starts.

■ The battery's power decreases with the temperature—during cold weather especially, keep the battery charged, clean, dry, and the water level up. Also be sure the alternator (generator) belt is properly tensioned so the battery keeps its charge.

■ Along with a winter tuneup, be sure the choke is properly adjusted and functioning. This might be a good time to spray the choke linkages and outside of the carb with choke solvent. Also be sure emission systems are operating—especially those that affect cold engine performance like the heat riser and/or thermostatic air cleaner.

■ You'll want to give your car's engine a break by switching to a lighter weight oil when the temp drops. For instance you can change from a 10W-40 to a 10W30 or even a 5W20 if the climate warrants it—check your owner's manual. Don't forget that the oil gets contaminated more easily in winter and should be changed about twice as frequently as normal.

■ The first thing most people think about when the temp drops is antifreeze. Most of us today use the permanent type glycol antifreeze/coolant. If you do, you've probably discovered that these days antifreeze is scarce and very expensive when available. A new way to beat this problem is with a special tester kit that checks the chemical condition of the solution. Rather than automatically changing the antifreeze every year or two, you can use the test kit to tell you whether or not a change is necessary. The simple-to-use kit consists of test paper (similar to litmus paper) and a comparison chart. To test the antifreeze

MORE

The Backyard Mechanic is designed to serve as only a general guide to the maintenance topics discussed. Since basic procedures vary from car to car, a manual should be consulted when performing any maintenance. And any jobs that the "backyard mechanic" feels are beyond his capabilities should be left to experts.

you just dip a test strip in the solution—the color the paper turns indicates the condition of the antifreeze. In any case, be sure to regularly check the freeze protection of the antifreeze throughout the winter.

■ Snow tires are made to carry the same amount of air pressure as is recommended for conventional tires of the same size classification. Remember to remove snow tires after the winter season; many tire companies refuse to give warranty on snow tires because drivers use them year round.

■ When doing your own maintenance know your limitations. Many people spend more time and money trying to do a job without proper tools and/or

continued

knowledge than if they'd taken the job to a mechanic.

■ Auto repair courses offered through community colleges and adult education programs are great places to learn how to perform basic maintenance.

■ Always use an up-to-date manual. But don't depend entirely on the manual. People who can only follow the step-by-step instructions in a manual can get into big trouble if something goes wrong. Know what you're doing and why before beginning a job.

■ Skimping on maintenance is false economy. But you can also overdo it on today's cars that are designed to be more maintenance-free. Follow recommended maintenance procedures and schedules, but don't get carried away performing unnecessary work.

■ With many regular maintenance items, such as oil changes, the manufacturer recommends more frequent servicing for "adverse" conditions. Chances are what you consider "normal" the manufacturer considers adverse and your car can benefit from the more frequent maintenance.

■ Best way to keep long-run operating costs down is to keep up with basic maintenance like oil changes and tuneups. And keep drive belts tensioned and the battery clean, dry and properly filled. Keeping the cooling system in top condition is essential with today's hotter running engines.

■ Find a good local mechanic you can depend on for repairs you can't handle. Don't try to impress the mechanic with your knowledge by diagnosing the car's problem for him. If you tell him to fix something, that's probably just what he'll do whether or not that repair was necessary.

■ Don't skimp on parts—top quality parts are not much more expensive.

■ Precisely follow all manufacturer's recommended procedures and specs. Example—according to the Champion Spark Plug Co., every degree in timing advance beyond the manufacturers' specs reduces plug life 1,000 miles.

■ Systematically break down auto problems to basics—even problems that seem complex are usually very simple.

■ When working under a vehicle, raise the vehicle high enough to give yourself plenty of room to work. Be sure vehicle is well supported with safety stands and is securely chocked.

■ Keep the work area neat, clean, and organized. Knowing exactly where each tool and part is when it's needed makes the job go much faster.

■ Drips underneath your car could mean many things, depending on what's dripping and from where. To locate the source of the leak, spread a newspaper on the spot and catch the next dripping and find out whether they're oil, brake fluid, radiator coolant or what. Then you can determine the trouble.

■ If your battery goes dead and the car is upwards of 3 years old, you probably need a new battery. But if the old battery and charging system check out, look for electrical leaks. A new one with '74 cars is leaving a package on a front seat that causes a trickle of current to flow through the seat-belt inerlock system.

■ Slippage in the drive which makes it feel like the engine is going faster than the wheels, especially uphill, usually means low automatic transmission fluid on an automatic or a

slipping clutch on a manual. An adjustment may cure the problem, but have it checked out in any case.

■ Screeching when you turn on the air conditioner or when you turn a corner means a loose or glazed drive belt. Adjust belt tension, and check the belt for wear and glazing.

■ Buzzing in the radio with the engine running is usually caused by spark-plug wiring or lack of ignition shielding. Clicking sounds when the wipers are going usually indicates a worn motor.

■ Loud clunks when you start the car moving after a stop, especially when changing directions, usually mean worn universal joints in the drive line.

■ If your car pulls strongly to one side when the brakes are applied, you've probably got an underinflated tire or possibly contaminated or worn brake lining.

■ A pulsating brake pedal that vibrates under your foot and feels like a tingle or buzz indicates something out of round in drum brakes or misaligned in discs. This calls for truing the drums or realigning the discs and refacing them.

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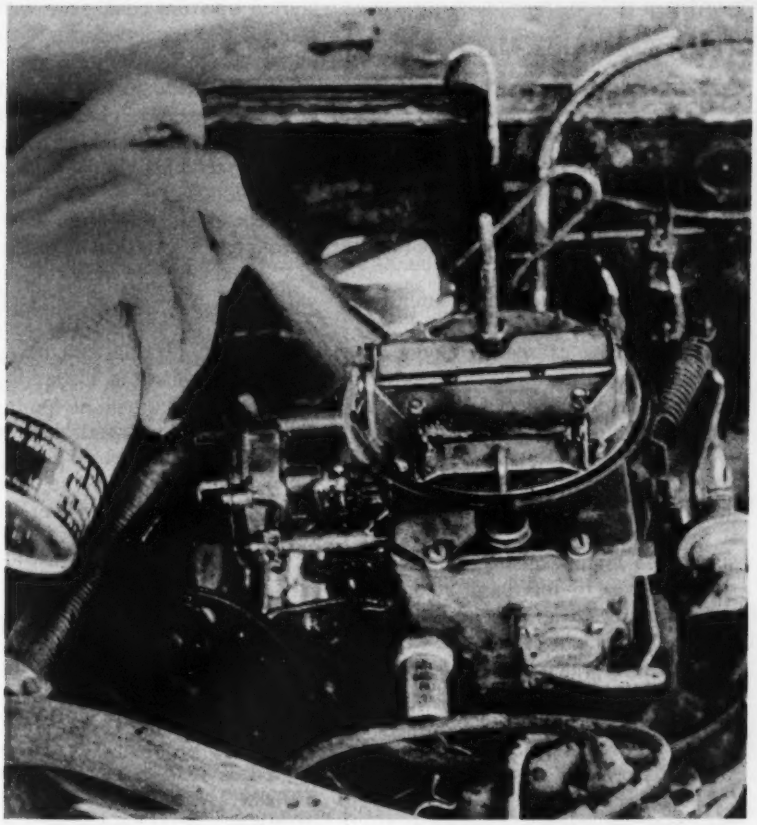
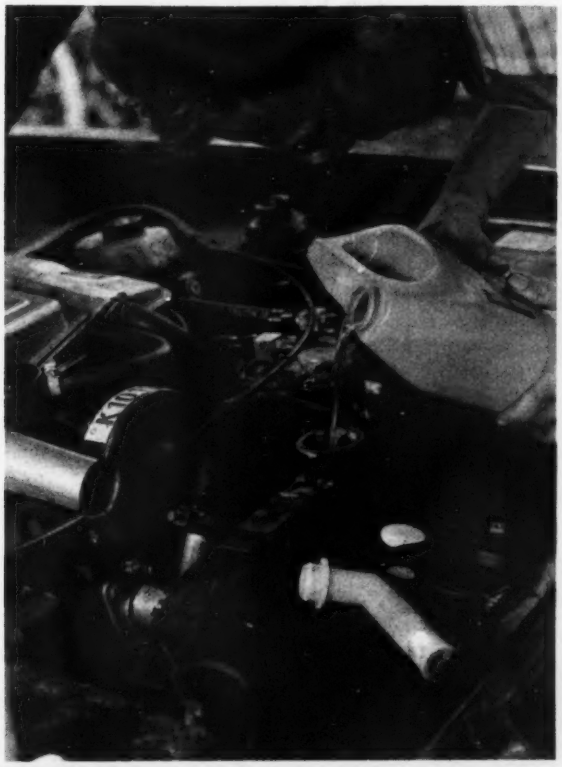




■ Drifting on the road when you take your hands off the steering wheel usually means an underinflated tire. But if it happens with correct tire pressures, it could be a front-end alignment problem.

■ Manual-shift cars that chatter on takeoff usually have a clutch problem. Chatter can be caused by engine or transmission oil on the facings of the clutch disc. You'll need to replace the clutch, but if you take care of the job immediately you might be able to replace only the disc instead of the more expensive pressure plate as well.

■ Grinding when you turn the key to start the engine means a sticking starter drive. In this case, replacing the starter drive is a lot less expensive than replacing the ring gear on the flywheel, which it could damage.

■ When a car hops across the road as it takes a washboard corner, the trouble is worn shock absorbers. If yours have been on the car for a couple of years or 15,000 miles, they may need replacing.

■ An engine that runs too fast when started up from cold, even with your foot off the accelerator, probably has choke problems. Check the choke shaft idle mechanism to see that it works freely. Also check the throttle return spring. Special aerosal choke cleaning solvents should be used for cleaning.

■ Clear exhaust does not necessarily mean that a car doesn't pollute the air. If a plug is misfiring or the carburetor is out of adjustment, your car could be putting out increased HC and CO. Special exhaust gas analyzing equipment is needed to check for sure.

■ To keep your windshield washer working, use it a lot. When it quits, check for solvent in the reservoir, hoses connected, pump working and then for a plugged line.

■ Vibration at a specific speed or at all speeds indicates that something is out of balance. A tire can go out of balance when a wheel weight falls off. Driveshafts also can cause vibrations but check tires and wheels first because they are more likely to cause problems.

■ Brakes that screech or grind are probably worn. With disc brakes a gentle grinding sound every time you touch the brake indicates that the pads are worn through to the steel backing plate. Drum brakes screech more than grind but the message is the same. Fix them now or pay a lot more for repairs shortly.

■ When trying to change a tire, you often may find that the lug nuts have been put on with an air wrench or rusted tight so you can't turn them by hand. So, use your foot to push the wrench to get them started. Then, to avoid having the trouble next time, oil the threads and tighten wheel lugs only tight—not super tight.

■ These days with oil changes less frequent, changing the filter at every oil drain is a good idea. If you don't change the filter, you're mixing about a quart of contaminated oil with the new oil which will neutralize some of the additives of the new oil.

■ Low brake fluid doesn't always indicate a leak. In late-model cars with disc brakes, it can be an indication that the pads need to be replaced.

■ If you carry a fan belt, radiator hoses, points, plugs and fuses with you any service station can install them to get you going in an emergency. But even if you have a Chevy, you won't always be able to get a special hose or belt on Sunday.

■ A faint clicking sound when you hit the starter means the battery is low, the wiring connections are corroded or the starter solenoid isn't working. To help prevent this corrosion of the terminals, clean with a special wire brush or a pad of steel wool.

■ If your car is relatively new, the plasticizers from the upholstery cook out of the seats in the sun's heat and collect as an opaque scum on the glass. There are special cleaners designed to cut it, but white vinegar and a piece of paper towel work fine.

■ Uneven tire wear is a common problem but one that's often not found until it's too late to save the tire. If one side of the tire is worn down, the alignment is out and should be checked when the tire is replaced. Cupping or scalloping wear patterns may appear when ball joints are worn or shock absorbers are shot.

■ Nylon stockings can be useful as a chrome polisher and, when wet with water and detergent, makes a good scrubber to remove bugs from the windshield without scratching the glass. A pair of nylon stockings can make an emergency tow rope.

About Miss DRIVER

(back cover)

Jo Ann van Leuven has a simple philosophy about traffic safety—she doesn't date guys who speed or who drink and drive. She is a tennis enthusiast, works as a model, and is studying to become a department store buyer.

Facts About Tires

Tires have a lot to do with your safety on the road. Here are some facts you may not have thought about.

- If your tires lean in or out they are wearing more on one side of the tread surface than the other. Have this improper camber setting fixed for safer steering and better tread wear.
- Replacing just one tire? For better all around braking traction, pair the new one with the old tire with the most tread, suggests the Tire Industry Safety Council.
- The soft look of a radial may be deceiving, but not necessarily unsafe. A sidewall bulge near the road contact area is normal. Check air pressure with a gauge if you think the tire is low.
- Your garage floor may damage your tires if you don't keep it clean. Accumulated oil from parking surfaces can coat tires and cause deterioration.
- Replacement tires should never be smaller than the originals. A smaller size may affect ground clearance, instrument accuracy and the suspension system.
- A bubble on a tire sidewall is generally serious trouble. The protrusion may mean separation of one or more layers of the rubber the tire is made of, and can cause sudden disablement.
- Remove and replace tires immediately if any ply cords show through snags, cuts or cracks in the sidewall or tread. Replace also if the wear indicator shows. This feature is built into every new tire made in the last two years.
- Toeing in and toeing out is bad for tires. An improper setting, with wheels on the same axle pointing toward or away from each other, will cause tires to drag down the road rather than rolling smoothly and evenly.

Taking a '75 Overseas

If you are planning to buy a 1975 automobile with the idea of taking it overseas, there are some things you should consider first.

The majority of '75s are designed to use unleaded gas because they are equipped with catalytic converters for reducing exhaust emissions. But unleaded gasoline is not available overseas, so you will have to burn the gasoline you can get. This will present an immediate problem because the new car will have a special gas tank opening that the ordinary gas nozzle will not fit. You will have to carry some kind of funnel-like adapter in order to refuel.

A much more serious problem will occur when you try to bring the car back into the States. U.S. Customs is going to hold you up at the port because your car will no longer conform with U.S. emission standards. The leaded fuel you burned overseas will have ruined the catalytic converter. (In fact, it takes no more than two or three tanks of leaded gas to render the converter ineffective.) Customs will require you to post a sizable cash bond with them before your car is released. They will hang on to that bond until you can show proof that your car meets the emission standards.

There are ways to get around the problem. You may want to pick your '75 from the relatively few which meet the new standards without the catalytic converter. These cars will also call for unleaded fuel, but they can be operated on leaded fuel with little if any permanent damage to their emission control components and will perform almost as well on leaded fuel as on unleaded. Then there will be no hangups at Customs when you return to the States.

Of course, you can always settle for a used car. With any 1974 or earlier model, catalytic converters are not part of the emission control system.

Another alternative would be to buy whatever car you want now and then sell it overseas before returning home. However, while you may not have to worry about the problems involved in getting the car back into this country, you may take a substantial financial loss in the used car market overseas.

Conserve Energy, Save Money

To conserve energy for the nation and save money for yourself, how about driving fewer miles a year?

The average car owner drives about 13,000 miles a year. Gas mileage tests of 1975 models show the average car gets 13.6 miles to the gallon. Based on these figures, the average motorist would consume about 956 gallons of gas in 12 months and pay $574 for it at 60¢ a gallon.

Analysts at Ford Customer Service Division worked up the following table to show the results of a little less driving per year:

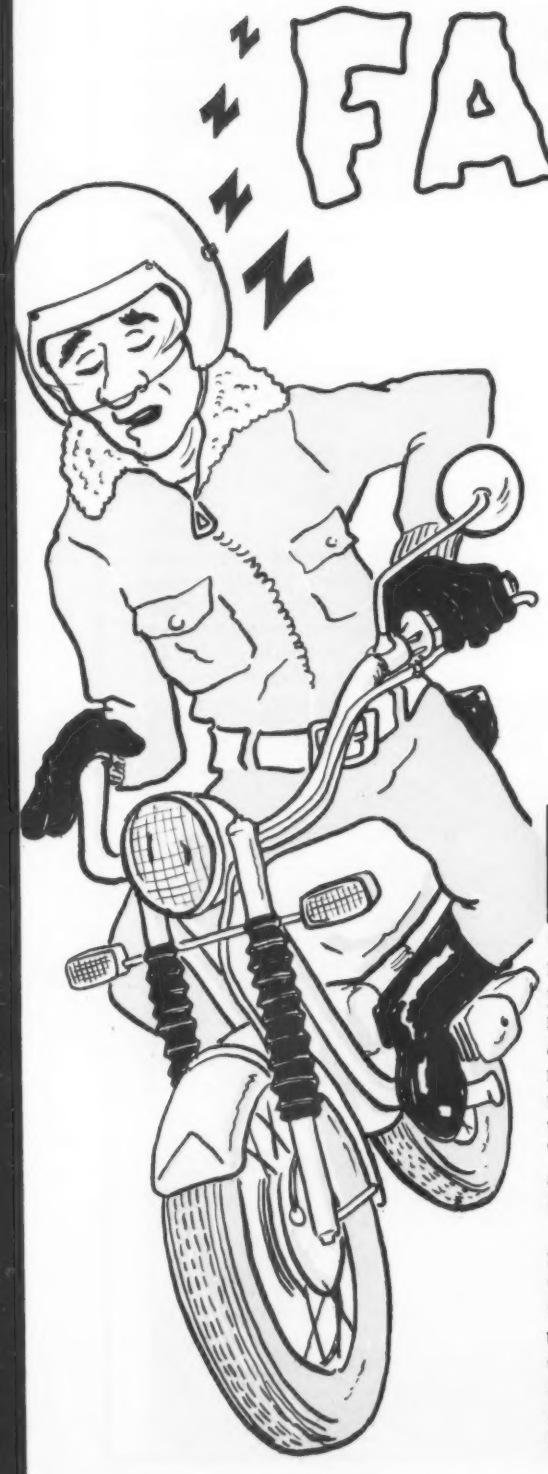
Miles Driven (per year)	Gallons Used (at 13.6 mpg)	Cost Per Year (60¢ per gal)
13,000	956	$574
12,000	882	529
11,000	809	485
10,000	735	441

If all of the 100 million cars on the road reduced their annual mileage from 13,000 to 10,000, the U.S. could save 22 billion-one-hundred-million gallons of fuel. Motorists would save 13 billion-three-hundred-million dollars.

Snowmobiles

The Comptroller General of the U.S. ruled in October that a snowmobile is not an item of household goods and may not be shipped at government expense. Since shipment may not properly be authorized, the subsequent storage at destination also is not payable by the government. Pertinent regulations and manuals are now being revised to reflect this decision.

FATIGUE



by Larry Johnson

Larry Johnson began his riding career back in 1948 with a Cushman motor scooter. He soon moved on to a Mustang Motorcycle, a '48 Harley, then a '62 Harley. Currently he owns a '58 Cushman Eagle and a Honda CB 350. Larry is a Navy officer stationed at Norfolk. In addition to motorcycling, he enjoys flying with the Norfolk Navy Flying Club. He presently holds a commercial certificate with instrument and multi-engine ratings. DRIVER considers him well qualified to give advice to new riders; the views expressed in these columns are strictly Larry's own.

Have you ever heard of someone falling asleep while riding a motorcycle? It happens often enough in automobiles because they are designed to be comfortable and of course drivers will push themselves too far. But on a motorcycle? That's unbelievable—*but it has happened.* And, as with automobiles, it happened because the rider tried to push himself too far under what seemed to be good conditions. The problem is plain old fatigue from a combination of three factors: wind buffet; vibration; and chill.

Before we get into examining these factors let's understand that we are talking about a rider who is free of the effects of alcohol and commonly used, over-the-counter cold medicines. Both of these, even in legal amounts, cause sufficient reduction of alertness so as to be an immediate hazard to a rider.

So let's talk about wind buffet first. Bombing down the road with a stiff wind in your face is probably one of the more thrilling and exciting aspects of riding a bike—that old wind-through-your-hair feeling. If it's a lonely road that's okay, but with other traffic there is a tremendous amount of wake turbulence from cars and trucks. You know what I mean if you have ever been hit in the face by the "bow wave" of a big semi rig going the opposite direction.

The Air Force did some tests a few years back on airborne recovery of parachutists primarily to see if we could snag our guys out of the air before they dropped into Charlie's lap. The recovery aircraft were using "catch" speeds on the order of 105 to 120 knots. They found that at that speed the survivor had to be reeled into the airplane within about 18 to 20 minutes of "catch" to prevent his losing consciousness from wind buffet.

WIND CHILL CHART

(Speed)	Thermometer Reading								
	80	70	60	50	40	30	20	10	0
10	77	64	50	40	28	16	4	−9	−24
20	73	59	44	32	18	4	−10	−25	−39
30	71	56	41	28	13	−2	−18	−33	−48
40	70	55	39	26	10	−6	−21	−37	
50	69	54	38	23	8	−8			
60	68	53	37	20	7	−10			

Wind breaker and close-weave trousers

Full leathers or heavy clothes and long johns

Exposed flesh freezes

1. Pick column closest to outside temperature.
2. Go down column to line expected speed.
3. Read equivalent temperature.

Scaling down to the 50 to 60 mph range of a motorcycle, this works out to about an hour or a little more just by math. Unfortunately we have no good data at these speeds and the reduced wind pressure on a motorcycle may be more than compensated for by human muscles.

Your head is a big melon wrapped in fiberglass and resin, and neck muscles must hold it up against the direct frontal pressure as well as the side-to-side buffeting caused by wake turbulence from cars and trucks. I'm one of those characters who just doesn't like fairings—even though old age is creeping up—and after about an hour and twenty minutes my head feels like a tether ball on a loose string. I'm ready to get off and take a rest. The answer of course is a good fairing that will block or deflect some of that wind. The improvement in riding behind a fairing is impressive.

Vibration is the next fatigue factor and a bike rider encounters two kinds: high frequency vibration similar to what you get from a barber's massage vibrator; and low frequency resonances that produce a hobby horse effect or back-and-forth rocking.

A rider feels the high-frequency vibration from the handlebars, through the arms and shoulders and from his rear-end up his spine. Road vibration, engine vibration, front-wheel shimmy and even lateral vibration due to wind buffet on an off-centered, fork-mounted fairing, all find their way into the rider's bone structure and eventually to his brain. The actual mechanism of vibration fatigue is not clearly understood but the best comparison is the drowsiness you feel from a barber's clippers as he trims your hair. The total effect is to dull a rider's thinking and decision functions—his traffic scan, his ability to "read" a developing traffic problem, his ability to make a decision *in time*—all of these will suffer after prolonged exposure to high-frequency vibrations.

Resonance, a hobbyhorse effect, occurs when the bike runs at a speed that produces a fore-aft weight transfer that exactly matches the stiffness of the forks, rear shocks and tire pressures. This is a 1 or 2 per-second, back-and-forth effect that is tiring because the rider's muscles try to isolate his body from it. On my bike it occurs about 35 miles per hour. The way to beat it is to change speed.

Vibration fatigue can be reduced by matching your bike to the type of riding you will do. On a long cross-country over good roads you can adjust for the softest ride possible—use the lowest acceptable tire pressure and lightest shock settings consistent with the load on your bike. Check the

continued

WIND BUFFET

weight placard and your owner's manual for the information.

A set of high-rise handlebars helps —not high; 8- to 12- inch rise above stock is suitable, and slant them aft slightly so your arms are relaxed. Ape-hangers make the problem worse. On bikes equipped with snubbers or shimmy dampers, these should be adjusted to just damp out the shimmy and still allow easy control.

Wind chill is the third and last fatigue factor. Chilling of the body by wind requires that the body try to keep the chilled areas warm. The chilled areas are usually hands, arms, feet, legs, and sometimes face; the body produces this heat by forcing muscle activity. We know this as shivering. When we work muscles we get tired and shivering produces fatigue just like any other muscle activity.

The answer is proper clothing to prevent chilling, and you must have some means of gauging what is necessary. One of the guides is the good old wind chill chart. You can see from the chart that 60 mph on a beautiful 70° spring day gets to be downright cold, so dress accordingly. You can always zip down a jacket to ventilate while riding along and you can remove clothes when you stop. Add wet clothing and the wind chill is worse so you've got to be prepared for rain. A fairing is a fine defense for wind chill fatigue since it keeps the rider out of the direct blast of wind.

Well, to wrap this up, let's return to something mentioned at the beginning: time. The length of time a rider is exposed to these factors is the primary gauge of how tired he becomes. An important thing to remember is that a tired rider is the one person who is *not* capable of making an intelligent decision as to his own condition. If a long trip is planned, set a schedule of ride-and-rest and stick to it. Each succeeding rest stop should be longer. By the time you've spent eight hours in the saddle your body has had it and a good night's sleep is the only thing that will help. For myself I've found that an hour-and-a-half traveling period is a good compromise for distance and fatigue. By that time you will probably need to refuel anyway.

Learn to recognize the signs of fatigue. It will creep up on you fast. First sign is a loss of coordination—two or three missed shifts. Next will come lane-wandering. You won't stay in your good ol' left-wheel track. Then vision fixation, staring at something too long like the taillights of the car ahead, or your own speedometer. Next come things like late braking or maybe a screeching stop when it wasn't necessary (loss of depth perception). When you get to the point of having an itchy feeling all over and you want to take your hands off the handlebars, that's it! That's when you must pull over and stop and just stretch out on the grass. In cold weather cut your times shorter and find a rest stop where you can warm up.

Larry Johnson

LETTERS TO THE EDITOR

BACKFIRE

Address your letters to:
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ROUNDABOUTS

Regarding "Opinions" September 1974, SSgt Robert W. Barth will continue to have problems driving in England not only because of the narrow streets but also because he is hunting for a collision. Roundabouts are indeed a thorny problem, but they are much easier to get used to when you realize that the driver on the right has the right of way and is not "supposed to yield" as SSgt Barth maintains. The British Ministry of Transport Highway Code Article 81 states, "Roundabouts—give way to traffic coming from your immediate right, unless road markings indicate otherwise, but keep moving if the way is clear."

Please Sgt, don't visit us in Cornwall.

Lt R. P. Airgood, USN
CWO2 Robert J. Ryan, USN
RAF St. Mawgan
Newquay, Cornwall

Your DRIVER magazine is unquestionably a good product. I rate it among my "must-read material"! Its contribution to safety is very positive.

In the "Opinions" article, Sep 74, a contributor calls the Roundabout (Traffic Circle) "the biggest hazard." He goes on to state that the car on the right is supposed to yield.

I feel the Local/Overseas Indoctrination has failed here and I will do my best to follow through at local level to correct this misinterpretation. The Roundabout is not a hazard, but can be converted to one by misunderstanding its application.

Primarily the function of a Roundabout is to maintain a steady, controlled, slow-speed flow, at an intersection, with filter-out action at exits, as opposed to a stop/start movement at a multiple junction.

The rule at Roundabouts is, "Give way to traffic COMING FROM YOUR IMMEDIATE RIGHT, unless road markings indicate otherwise!"

There is also an assumption that right-of-way may be taken for granted. Once again this subject is apparently not properly understood.

I felt I had to take up the cudgel here in an attempt to correct a view that I fear exists in more than the contribuor's interpretation.

Safety is a product that demands constant vigilance and attention before the act. No person should be behind the wheel, mind in neutral, vehicle in gear. New generations come, new problems come, keep your magazine coming.

D. Nicholson (UK Civ)
Base Drivers School Instr.
RAF Lakenheath
APO New York 09179

Reference your "Opinions" article on driving in Europe: Someone is quoted as saying, "The biggest hazard in England has to be the roundabout (traffic circle) . . ."

If he thinks the car on the right is "supposed to yield," he probably *has* found that roundabouts are dangerous places—for him. Unlike the rest of Europe, however, here in the United Kingdom the traffic already *in* the roundabout has the right of way. And since we drive on the left here, when you enter a roundabout the traffic that's already going around is coming from your right . . . get the picture? If you stick your nose out expecting the car on the right to wait for you, you're going to get something seriously bent out of shape.

On the Continent, I'm told that the opposite rule holds. Because traffic drives on the right and goes around traffic circles to the right (counterclockwise) and the man coming from the right has the right of way, the result is a very dangerous (in my opinion) series of jerks and starts

continued

around the traffic circle as everyone coming into the darn thing has a legal shot at that tiny space just in front of you. But in England you gear down, check to the right, slip into the roundabout and head on around smoothly until your exit comes up. Signal and you're out.

Roundabouts here are used in a lot of situations where we would use traffic signals. In cities they aren't too bad, but it can get irritating on main trunk roads. The effect is the same as if all the stop lights were yellow—you never get a "green light" and have to slow down for #*@&! roundabout; seemingly just as you get into fourth gear again it's time to downshift and start the process over.

Didn't mean to get so wordy. We've been here two years, drive a VW van, and have been able to get around fine. My wife and I took the drivers' orientation course here (it was optional for her) and (so far, knock on wood) haven't had any problems. I agree, you do have to keep your eyes peeled—but they oughta be peeled wherever you drive.

Maj Mark R. Foutch
Chief of Information
48th Tactical Fighter Wing (USAFE)
RAF Lakenheath

DRIVER thanks you sharp-eyed readers for catching the error in Sergeant Barth's explanation of roundabouts. And a special "thanks" to Driver Instructor Nicholson, who's going to get a better explanation of roundabouts into the Local Indoctrination program.

THIS 'N THAT

Some thoughts on recent articles:

1. It is important to get from high beam to low beam when you first see your light reflected in an animal's eyes. If done soon enough the animal may escape being blinded long enough for noise to scare it out of danger.

2. Restful for the driver's eyes is a fog lamp aimed just below the low beam. The wide bright (not amber) area near the car protects from tunnel vision and partial blindness from headlights of vehicles. Low aim allows lamp to be left on—does not irritate other drivers. (This is also the best angle for reduced visibility use —when weather is bad.)

3. Motorcycles should avoid being a nuisance with daytime use of high beam.

4. Anything you can offer that might help the motorcyclist is of tremendous value. The cards are stacked against us.

Capt William J. Husson
21AD/DOPM
Hancock Field NY 13225

SUMMER MEMORIES

I enjoy your magazine for its high quality and interesting articles. Although I thought July rather late for an article on safe boating, I thought the article very appropriate except for two items: (1) As you state, "Pulling two skiers at once means just half as many starts and stops and that means you will save fuel." That's fine except for the fact that pulling two skiers (especially novices) can be a rather dangerous form of pleasure. I have no statistics, but I imagine the possibility of injury pulling two skiers is somewhat more than twice as probable as for one. (2) You also discuss passing unpowered craft. You are responsible for your wake as it affects unpowered craft. Most pleasure boats of the planing type produce a *bigger* wake at slower speeds. Boaters should maintain their plane or slow down to no-wake speed. Usually, just slowing down brings the boat off the plane, making it a displacement hull and produces a larger wake.

Capt William E. Eubank
Officer Training School
Lackland AFB TX 78236

FOR BACKYARD MECHANICS

First let me say I enjoy your magazine, especially your "Backyard Mechanic" articles. But I do have to take exception to your article on running a compression check. You say when the spark plugs are removed and the throttle is blocked open "you're ready to go." WRONG. You forgot the most important step, that being grounding of the high tension lead from the coil. Cranking the engine without grounding the secondary voltage lead of the coil could literally destroy your coil. That 25KV has to go some place so by just pulling out the high tension lead of the center tower of the distributor and putting it on the block you can accomplish this grounding very easily.

I realize that the article is for whom it says ("Backyard Mechanics") but with wrong information and/or incomplete information a person could end up paying more to fix his mistakes . . . .

Mr. W. H. Rutsch
CINCLANTFLT
N002 Division
Norfolk VA 23511

The best procedure is to remove and ground the coil lead before cranking the engine. We're sorry this step was dropped out during typesetting.

First, my compliments for an excellent magazine, filled with good, commonsense type vehicular safety and maintenance. You've saved lives, not just dollars. Keep it up!

Just a short item, however, that you may find worth passing on. Please reference July 74's "Backyard Mechanic." You state: "Coat the tops of the cleaned battery terminals with petroleum jelly to help prevent corrosion." This common practice does two things: the jelly collects dirt and grime, and when under-the-hood temperatures get hot (they exceed 190°F in late-model cars) the excess heat absorbed by the metal terminals softens the jelly (or grease), allowing it to seep down between the terminal and the clamp. This causes more long-term problems than it's worth. A better solution, I've found, is to spray the cleaned terminals with a dry lubricant. It doesn't melt, collects no grime, the spray reaches all of the exposed terminal/clamp area, there's no mess, and I've never had such treated terminals corrode or short out.

Capt Norm Komnick
HQ ADC/DOTI
Ent AFB CO 80912

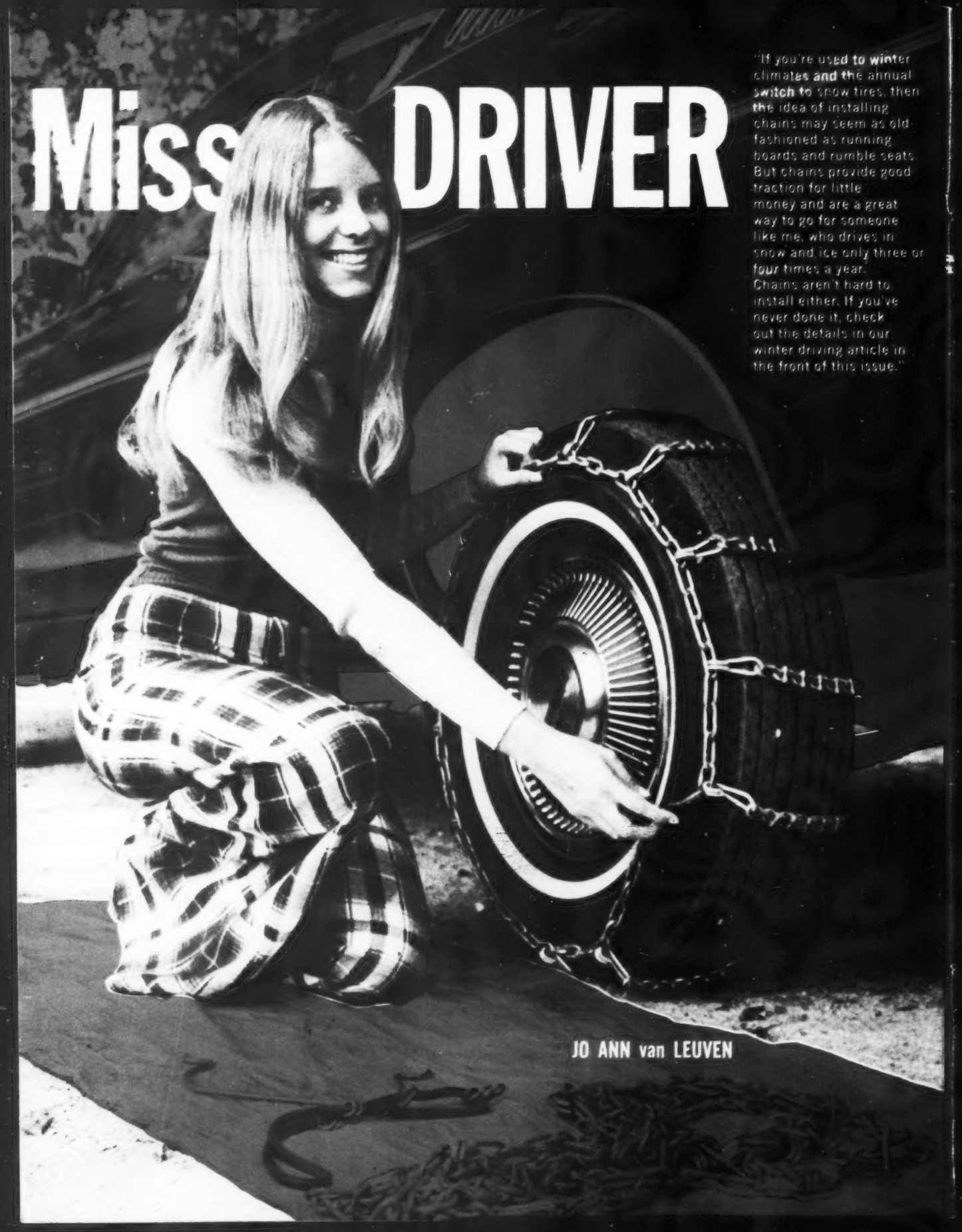
TUNEUP

pet peeve

My pet peeve is the auto driver when I'm riding my bike down the road. He doesn't seem to realize that the bicycle has the same rights as a car and deserves the respect given any other vehicle.

BT3 Michael S. Buesking
NAS Whiting Field
Milton, Florida 32570

Miss DRIVER



"If you're used to winter climates and the annual switch to snow tires, then the idea of installing chains may seem as old fashioned as running boards and rumble seats. But chains provide good traction for little money and are a great way to go for someone like me, who drives in snow and ice only three or four times a year. Chains aren't hard to install either. If you've never done it, check out the details in our winter driving article in the front of this issue."

JO ANN van LEUVEN